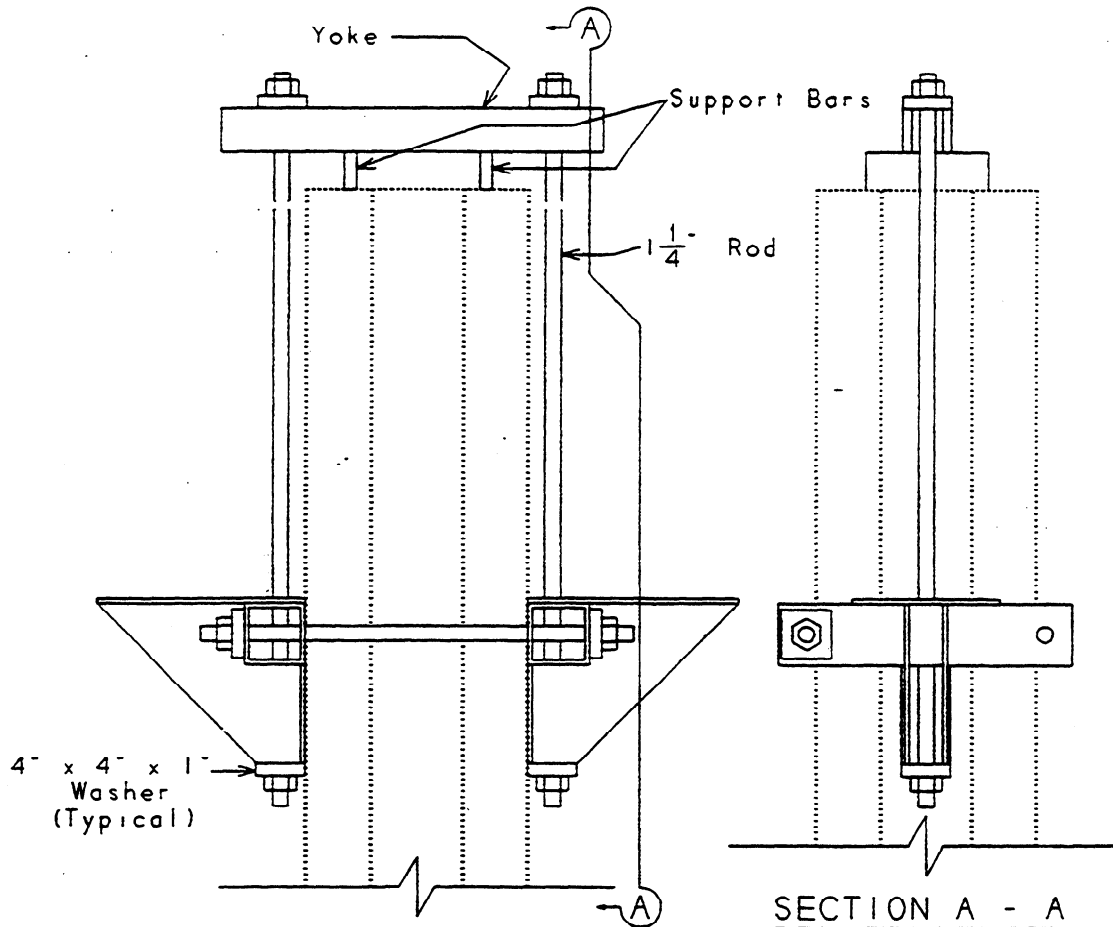


PILE COLLARS

A field test was performed to determine working load capacities of a pile collar. The pile collar depicted below, which emulates testing and proposed usage, was made up of two individual components consisting of a friction collar and a yoke assembly. The yoke assembly and the friction collar were interconnected by two 1 1/4 inch threaded coil rods. The friction collar was fabricated by the Gayle Manufacturing Company



The friction collar consisted of specially manufactured brackets welded to 5" x 5" x 3/8" structural tubes. The brackets were placed on opposite sides of a pile and were connected by threaded coil rods of 1 1/4 inch diameter which ran through the structural tubes near their ends. The threaded rods were torqued to 1,000 Ft-Lbs to provide the desired frictional resistance.

Additional support for the friction collar was provided by a yoke assembly mounted atop the pile. The yoke assembly consisted of double steel bars which were supported on steel bars and which carry a 1 1/4" threaded rod on either side of

the pile such that the threaded rods extend through the structural tubes of the friction collar.

The test was performed with a pair of calibrated jacks to evaluate the pile collar capacity, up to desired non-destructive loadings, for the following conditions:

- a. friction collar alone.
- b. friction collar in combination with the yoke assembly.
- C. to determine the amount of pile collar slip with load only on one side of the pile collar.

The specific method used for evaluating the pile collar and the observations made under the various loading conditions during the testing were as follows:

- a. The test load was applied simultaneously with the jacks to both sides of the friction collar to twice the desired working load. Approximately 1/8 inch of friction collar slippage occurred during this loading condition.
- b. While the load in the jacks was maintained, the rods connecting the yoke assembly to the friction collar were tightened to a snug fit. The loads in both jacks were again simultaneously increased to twice the desired final working load capacity. A maximum additional 1/8 inch slip of the friction collar occurred.
- c. To ascertain the amount of differential slip for application of load on one side of the friction collar only the load from one jack was completely removed. No significant movement of the friction collar was noticed as the load was being removed.

The total slip of the pile collar components under full test loading was no more than 1/4 inch, and no discernable slip differential was noticed when load was removed from one side of the test pile while the maximum test load was held on the opposite side. Throughout the testing procedure no pile damage was noticed at the location of the friction collar due to slip.

PERMITTED USE:

The purpose of the pile collar is to permit erection of falsework on the friction collars before the piles for flat slab bridges are cut to grade. The falsework will normally be set on sand jacks which will be mounted atop the friction

collar brackets. Once the piles are cut to grade the yoke assemblies may be installed atop the pile.

The yoke assemblies furnish additional support to the friction collar for carrying the reinforcing and concrete load of the superstructure and will limit the total amount of friction collar slip.

The Office of Structure Design has determined that the working load values tabulated below will not overstress the Caltrans standard 15" octagonal concrete piles provided the unsupported length of piling will be no longer than 18 feet.

Working loads, including an appropriate safety factor of 2, are indicated in the following table:

Allowable Working Load Per Bracket (per side of pile)	Friction Collar Only	Friction Plus Yoke
	20,000 Pounds	40,000 Pounds

The threaded rods of the friction collar are to be torqued to 1,000 Ft-Lbs and are to remain torqued tight until the supported falsework is removed. All threaded rods must have a minimum safety factor of 2 for the intended maximum loads to be used.

The steel yoke bars should be no smaller than 3/4" x 3 1/2". The yoke assembly should be supported on the piling in such a manner that it will not interfere with the bar reinforcing of the pile, slab, or cap and will not over-stress the concrete in the piles. The distance between the top of pile and the yoke bars should provide satisfactory clearance above the bottom mat and cap reinforcing. No revision to the structural reinforcing should be made to accommodate support bars or other yoke components. Distortion to the pile reinforcing spiral to accommodate the yoke components should be kept to a minimum. The vertical threaded rods shall have a minimum safety factor of 2 for the intended maximum loads to be supported.

The support bars for the yoke are to be located a minimum of 3 inches from the edges of the concrete piles, and are to be supported on smooth undamaged pile tops, or alternately on dry pack or similar hard concrete surfacing. This requirement is essential to keep local compressive stresses on the top of the piling as low as possible.

It should be anticipated that friction collar slip will be slight after the load transfers to the yoke assembly.

To facilitate removal of the falsework, sand jacks will generally be installed atop the friction collars. Grease may be placed on that portion of the threaded rod to be embedded in the concrete.

The threaded rods shall be removed as part of the falsework removal and the remaining holes in the structure shall be finished in the usual manner. Also, any damage to the piling may be corrected in the usual concrete finishing manner.

Friction collar assemblies will be manufactured by the Gayle Manufacturing Company. A certification of manufacture including working load values should be obtained through the contractor in the usual manner.

The pile collars may be identified by the CCM stenciled on the friction collars.